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Case Report

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Large Adrenal Ganglioneuroma Presenting with Clinical Pheochromocytoma: A Rare Case Report

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ABSTRACT

Adrenal ganglioneuromas are rare benign and non-secretory neoplasms that, in the majority of cases, are unexpectedly discovered during imaging studies. In this study, we reported a large adrenal ganglioneuromas in a young patient, clinically presented as a pheochromocytoma. Laboratory evaluation and tumor markers were also reported in the normal range. The mass was then resected through laparoscopy. Ultimately, histopathology revealed the diagnosis of Ganglioneuroma. Large adrenal ganglioneuromas can be resected laparoscopically without any complications. An accurate pathological examination is usually essential for definitive diagnosis. Prognosis of mature adrenal ganglioneuromas is excellent.

Introduction

Ganglioneuromas (GNs) are slow-growing, benign and well-differentiated neoplasms, originating from neural crest cells [1]. They are located in the retroperitoneal space (32-52% of cases), the posterior mediastinum (39-43% of cases), or the cervical area (8-9% of cases), while the adrenal source remains sporadic [2]. Since the majority of adrenal ganglioneuromas (AGNs) are nonfunctional, their detection is quite challenging. These tumors are often unexpectedly discovered by CT scans, MRIs, or ultrasounds performed for other reasons [3]. If AGNs are managed as adrenal incidentalomas, then screening tests should be performed before any operations in all patients [4]. Laparoscopic adrenalectomy is accordingly the gold standard treatment for symptomatic AGNs; however, pathologic study is mandatory for a definitive diagnosis [5, 6]. In the current study, we reported a large AGN, presented clinically as a pheochromocytoma.

Case Presentation

A 30-year-old male patient was referred to our center after ultrasonography of the abdomen with an incidentally detected 9 cm mass-like lesion in the upper

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pole of the right kidney. The patient had complaints of hypertension, palpitations and occasional chest pain without radiation to any specific area. His past medical history did not contain any systemic disorders, such as cardiovascular, gastrointestinal, or Reno vascular diseases, or even previous surgeries. Evaluation of blood pressure and heart rate revealed that they were higher than the normal range. Besides, physical examinations, electrocardiogram, as well as cardiac enzymes showed no abnormalities. Chest X-rays were also normal.

Laboratory studies, including complete blood count, renal and liver function tests, thyroid profile (TSH and free T4), urine biochemistry and serum electrolytes were within normal ranges, and also tumor markers did not report any abnormalities. Endocrine evaluations and 1 mg dexamethasone suppression testing were further detected within normal ranges (Table 1). Supplementary assessments, including contrast-enhanced computed tomography (CECT) of the abdomen, additionally confirmed the presence of a 92 mm × 60 mm mass in the right suprarenal location with an enhancement of 20 HU. No calcification or invasion of the adjacent tissues was observed on the CT scan (Fig. 1). A laparoscopic right adrenalectomy was finally performed. For this purpose, the patient was placed in a left lateral decubitus and reverse Trendelenburg position and four ports were then placed. First, the right triangular ligament of the liver was divided, and

Table 1. Lab Data

Tests	Unit	Reference range	Results
Thyroid-stimulating hormone (TSH)	micIU/mL	0.4–4.2	0.848
DHEA-SO4	µg/dl	80_560	130.0
Urine cortisol	µg/24 h	4.3–176	54.4
Urine creatinine	gr/24 h	0.8–1.8	1.56
Plasma renin activity In supine position	ng/ml/hr	0.06–4.69	1.03
aldosterone In supine position	ng/dl	3.7–31.0	4.8
Plasma free metanephrines	pg/ml	12–60	16.80
24 hr urine metanephrines	mcg/24 hrs	25–312	38.6
Plasma aldosterone/renin ratio	_	2–17	4.66
24 hr urine normetanephrines	mcg/24 hrs	<600	90.7
Free thyroxine (FT4)	Ng/dl	0.8–1.8 (21-54Y)	0.869
Serum cortisol	µg/dl	8 AM: 5–23 mc/dl 4 PM:3–13 mc/dl	5.61

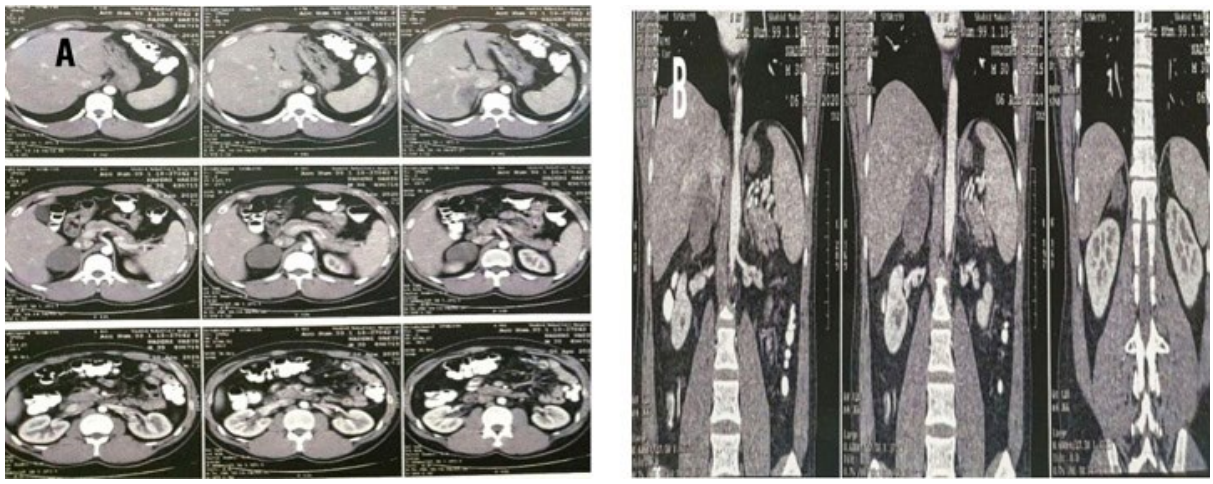

Fig. 1. Computed tomography (CT). (A) A mass lesion of the right adrenal gland surrounding the right kidney. (B) Coronal CT scan showing an adrenal tumor pushing, but not infiltrating, the right kidney.

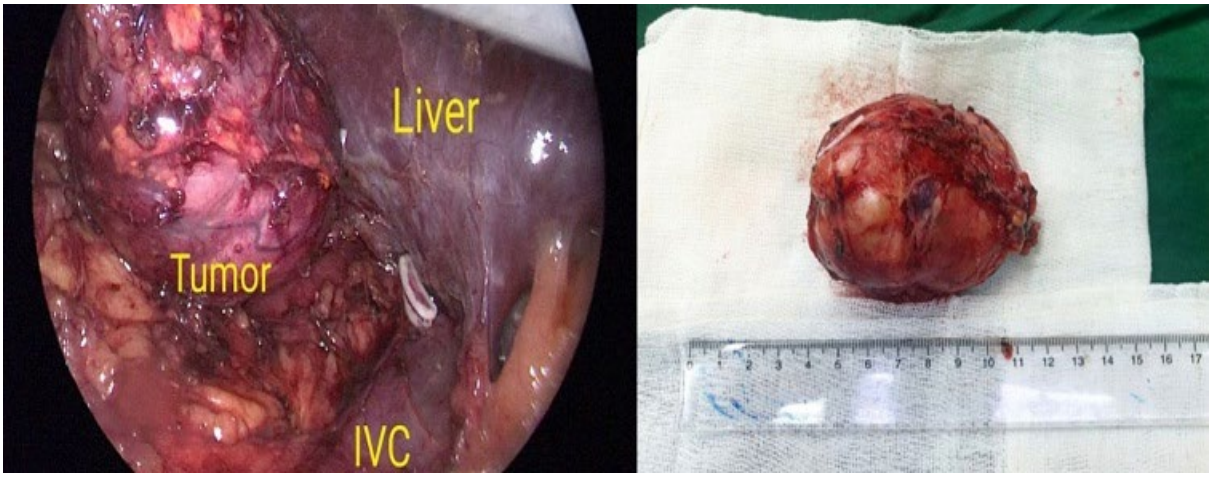

Fig. 2. Intraoperative images of right adrenal tumor

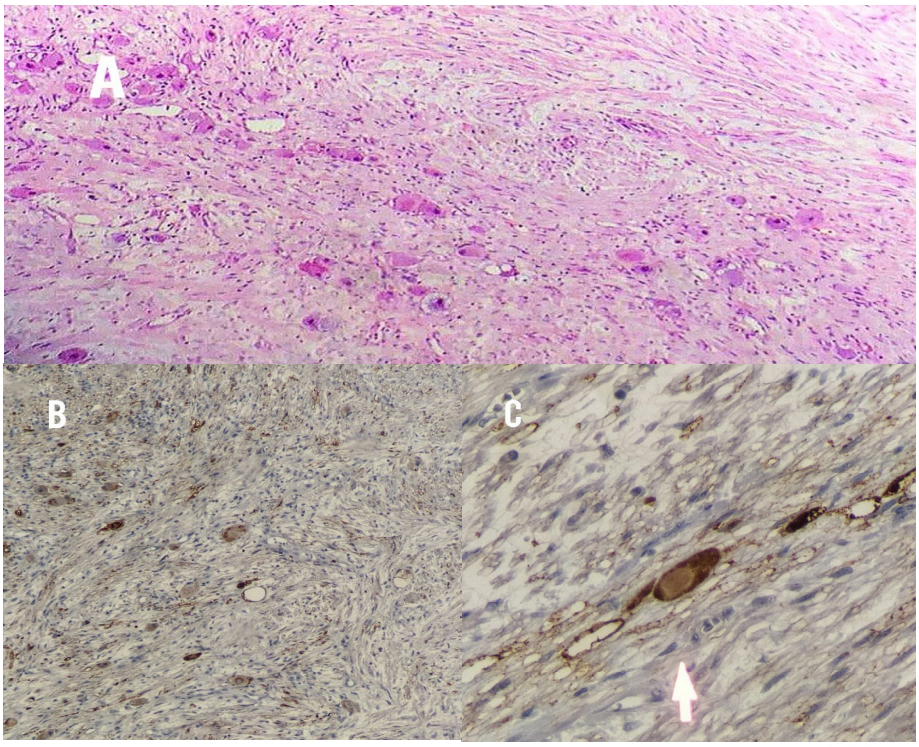

Fig. 3. Microscopic view of the adrenal tissue stained using hematoxylin and eosin (HE), and synaptophysin. Section shows proliferation of cells, single eccentric nucleus and prominent nucleolus (mature ganglion cells) admixed with Schwann cells. (A) Synaptophysin staining 40×: pattern of ganglions and Schwann cells in the neoplasm; (B) Synaptophysin staining 100×: ganglion cells in details (C).

the liver was retracted in a cephalic direction using the cobra liver retractor, inserted through the epigastric trocar. The inferior vena cava (IVC) was also identified. The peritoneum along the lateral aspect of the IVC was subsequently incised to expose the adrenal vein. Afterwards, the adrenal vein was ligated and cut. Then, the adrenal mass along with the gland was mobilized and dissected. After removing the mass using an endobag, a Jackson-Pratt drain was inserted into the operative field. During a macroscopic examination, the weight and the size of the mass were measured at 230 g and 8.5 cm × 6.5 cm × 3 cm, respectively (Fig. 2). The tumor had a creamy brown solid appearance. Likewise, there was a white homogeneous encapsulated mass

in the cut sections. The specimen was composed of mature ganglion cells admixed with Schwann ones. A pathological examination similarly revealed a mature GN with positive staining of synaptophysin. There was no detectable malignancy on our examination. A pathological examination similarly revealed a mature GN with positive staining of synaptophysin (Fig. 3). By a follow-up after six months, the patient had no complaints and imaging was normal.

Discussion

AGNs account for less than 5% of all adrenal tumors [7]. Most of these tumors and other adrenal neoplasms, such as neuroblastoma, ganglion neuroblastoma, myeloma and angiomyolipoma, are often found incidentally in imaging studies performed for other purposes. Moreover, hemorrhagic adrenal adenoma, adrenocortical carcinoma, metastatic tumors to the adrenal gland and angiomyolipoma may mimic an AGN or myelolipoma [8]. Adrenal masses larger than 6 cm are more likely to develop malignancy, while the ones smaller than 4 cm have a lower risk. However, when these masses are asymptomatic or nonfunctional, they can be safely monitored [9]. Despite the large volume of mass in our case, no malignancy was identified in the pathology study.

AGNs are usually located around major blood vessels and do not apply significant pressures against them. However, sometimes the growth and proliferation of AGNs may locally cause symptoms [10]. AGNs are hormonally silent and nonfunctional. Nevertheless, they have the ability to secrete catecholamines and their metabolites [11]. Hormone screening tests should be thus performed before any operations in all patients with adrenal incidentalomas. Furthermore, about 4% of adrenal incidentalomas have been reported in cross-sectional abdominal imaging (4). These techniques are useful for diagnosing AGNs but not sufficient. Ultrasounds of AGNs can further detect a well-circumscribed, homogenous and hypoechogenic lesion [12]. CT scan findings are typically well matched with a well-defined, lobular-shaped, solid and encapsulated mass. Furthermore, CT scans show punctate calcifications in 20-69% of AGNs [13]. Accordingly, AGN masses larger than 5 cm with heterogeneity and calcification may show malignancy [14]. An MRI can further give a better soft tissue description, and AGNs show homogenously low or intermediate signal intensity in T1-weighted images and slightly heterogeneously high signal intensity on T2-weighted images [15]. Of note, the heterogeneity on T2-weighted images depends on the amount of myxoid stroma, collagen fibers, and cellular components present in the tumors [16]. In addition, scintigraphy and positron emission tomography (PET) can be utilized to diagnose AGNs. Results of standardized uptake values (SUVs) can improve the diagnostic accuracy of adrenal masses in cancer patients [17]. Despite being referred to our hospital, it was not possible to use PET routinely due to the high cost of PET scans.

In this sense, laparoscopic adrenalectomy is the gold standard treatment for AGNs, especially in lesions less than 6 cm [5]. However, it has been thus far performed for AGNs with a diameter of more than 13 cm without any major complications [18]. This useful procedure is characterized by shorter hospital stays, less postoperative disabilities, and fewer complications [19]. In the cases of malignancies and invasions of periadrenal tissues, a laparoscopic procedure is contraindicated and should be converted into open surgery. There is no difference in the overall recurrence rate between open and laparoscopic adrenalectomy techniques once standard oncological principles are followed [9]. As a final point, surgeon expertise and appropriate selection of patients are the most important factors dictating the outcomes. Microscopically, the characteristics of AGNs consist of mature ganglion cells and Schwann ones within a fibrous stroma. IHC studies, including neuron specific enolaseand synaptophysin, can play an important role in the diagnosis of AGNs [6].

Conclusions

AGNs are rare, well-differentiated and mostly nonfunctional benign tumors that may present with atypical symptoms. In this respect, laparoscopic adrenalectomy is the appropriate technique for their treatment. Histopathology is also the only way to confirm the diagnosis.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this article.

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Conflict of Interests

The authors have no conflict of interest to declare.

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